

What is claimed is:

1. A design support system for supporting a design of a connection between a conductor and a connector terminal, comprising:

5 an estimation unit which learns beforehand a relationship between known connection data pertaining to connection design and unknown connection data pertaining to the connection design for the known connection data,

wherein the estimation unit estimates the unknown
10 connection data pertaining to the known connection data in accordance with an input of the known connection data on the basis of the result of learning.

2. The design support system according to claim 1, wherein
15 the estimation unit is constituted of a multilayer feedforward neural network in which layers formed of a plurality of neurons are coupled together in a direction in which the layers run from an input layer to an output layer by way of an intermediate layer.

20 3. The design support system according to claim 1, wherein, when the conductor and the connector terminal are connected together through crimping, the estimation unit performs learning beforehand while taking, as unknown connection data,
25 any of a crimp width and a crimp height, a compressibility of

the conductor in a direction of the crimp height, adhesion force existing between the conductor and the connector terminal, and contact resistance existing between the conductor and the connector terminal, which are obtained after crimping.

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4. The design support system according to claim 1, wherein the estimation unit further comprises:

10 a C/W estimation unit which, when the conductor and the connector terminal are connected together by crimping, performs learning beforehand while taking the crimp width obtained after crimping as the unknown connection data and produces crimp width data by estimating the crimp width in accordance with an input of the known connection data required for estimating the crimp width; and

15 a C/H estimation unit which performs learning beforehand while taking the crimp height obtained after crimping as the unknown connection data and produces crimp height data by estimating the crimp height in accordance with an input of the known connection data required for estimating the crimp height,

20 wherein the crimp width data produced by the C/W estimation unit are input to the C/H estimation unit as at least a portion of the known connection data required for estimating the crimp height.

25 5. The design support system according to claim 4, wherein

the estimation unit further comprises:

a compressibility estimation unit which performs learning
beforehand while taking a compressibility of a conductor in
the direction of a crimp height obtained after crimping as the
5 unknown connection data and which estimates the compressibility
in accordance with an input of the known connection data required
for estimating the compressibility,

wherein the crimp width data produced by the C/W estimation
unit and the crimp height data produced by the C/H estimation
10 unit are input to the compressibility estimation unit as at
least a portion of the known connection data required for
estimating the compressibility.

6. The design support system according to claim 5, wherein
15 the estimation unit further comprises an adhesion force
estimation unit which performs learning beforehand while taking
adhesion force existing between the conductor and the connector
terminal after crimping as the unknown connection data and which
produces adhesion force data by estimating the adhesion force
20 in accordance with an input of the known connection data required
for estimating the adhesion force, and

the crimp width data produced by the C/W estimation unit,
the crimp height data produced by the C/H estimation unit, and
the compressibility data produced by the compressibility
25 estimation unit are input to the adhesion force estimation unit

as at least a portion of the known connection data required for estimating the adhesion force.

7. The design support system according to claim 5, wherein
5 the estimation unit further comprises:

a resistance estimation unit which performs learning beforehand while taking contact resistance existing between the conductor and the connector terminal after crimping as the unknown connection data and which produces contact resistance
10 data by estimating the contact resistance in accordance with an input of the known connection data required for estimating the contact resistance,

wherein the crimp width data produced by the C/W estimation unit, the crimp height data produced by the C/H estimation unit,
15 and the compressibility data produced by the compressibility estimation unit are input to the resistance estimation unit as at least a portion of the known connection data required for estimating the contact resistance.

20 8. The design support system according to claim 4, further comprising an input unit for manually inputting crimp width data to be input to the estimation unit as the known connection data so as to become equal to the crimp width data produced by the C/H estimation unit.

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9. The design support system according to claim 5, further comprising:

a sequential output unit which sequentially outputs, as the crimp height data, the crimp height data and a predetermined number of discrete values existing in a predetermined range centered on the crimp height data in accordance with an input of the crimp height data produced by the C/H estimation unit.

10. The design support system according to claim 1, wherein, when the conductor sheathed with an insulation cladding is connected to a slot formed in the connector terminal through press-fitting, the estimation unit performs learning beforehand while any of the slot width obtained before press-fitting, a crimp height representing a height from a base of the slot to the center of the conductor obtained after press fitting, load exerted on the conductor, withdrawal force exerted between the conductor and the connector terminal, and contact resistance existing between the conductor and the connector is taken as unknown connection data.

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11. The design support system according to claim 1, wherein, when the conductor sheathed with an insulation cladding is connected to and press-fitted into a slot formed in the connector terminal, the estimation unit further comprises

a slot width estimation unit which performs learning

beforehand while taking the slot width obtained before
press-fitting as the unknown connection data and which produces
slot width data by estimating the slot width in accordance with
an input of the known connection data required for estimating
5 the slot width; and

a crimp height estimation unit which performs learning
beforehand while taking the crimp height from the base of the
slot to the center of the conductor obtained after press-fitting
as the unknown connection data and produces crimp height data
10 by estimating the crimp height in accordance with an input of
the known connection data required for estimating the crimp
height,

wherein the slot width data produced by the slot width
estimation unit are input to the crimp height estimation unit
15 as at least a portion of the known connection data required
for estimating the crimp height.

12. The design support system according to claim 11, wherein
the estimation unit further comprises a load estimation
20 unit which performs learning beforehand while taking load
exerted on the conductor after press-fitting as the unknown
connection data and which produces load data by estimating the
load in accordance with an input of the known connection data
required for estimating the load, and

25 the slot width data produced by the slot width estimation

unit and the crimp height data produced by the crimp height estimation unit are input to the load estimation unit as at least a portion of the known connection data required for estimating the load.

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13. The design support system according to claim 12, wherein the estimation unit further comprises a withdrawal force estimation unit which performs learning beforehand while taking withdrawal force exerted between the conductor and the connector terminal after press-fitting as the unknown connection data and which produces withdrawal force data by estimating the withdrawal force in accordance with an input of the known connection data required for estimating the withdrawal force, and

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the slot width data produced by the slot width estimation unit, the crimp height data produced by the crimp height estimation unit, and the load data produced by the load estimation unit are input to the withdrawal force estimation unit as at least a portion of the known connection data required for estimating the withdrawal force.

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14. The design support system according to claim 12, wherein the estimation unit further comprises a resistance estimation unit which performs learning beforehand while taking contact resistance existing between the conductor and the

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connector terminal after press-fitting as the unknown connection data and which produces contact resistance data by estimating the contact resistance in accordance with an input of the known connection data required for estimating the contact resistance, and

the slot width data produced by the slot width estimation unit, the crimp height data produced by the crimp height estimation unit, and the load data produced by the load estimation unit are input to the resistance estimation unit as at least a portion of the known connection data required for estimating the contact resistance.

15. The design support system according to claim 11, further comprising:

an input unit for manually inputting slot width data to be input to the estimation unit as the known connection data so as to become equal to the slot width data produced by the slot width estimation unit.

16. The design support system according to claim 12, further comprising:

a sequential output unit which sequentially outputs, as the crimp height data, the crimp height data and a predetermined number of discrete values existing in a predetermined range centered on the crimp height data in accordance with an input

of the crimp height data produced by the crimp height estimation unit.

17. The design support system according to claim 11, further
5 comprising a sequential output unit which sequentially outputs,
as the slot width data, the slot width data and a predetermined
number of discrete values existing in a predetermined range
centered on the slot width data in accordance with an input
of the slot width data produced by the slot width estimation
10 unit.

18. The design support system according to claim 1, further
comprising:

a sequential output unit which sequentially outputs, as
15 the known connection data, the known connection data and a
predetermined number of discrete values existing in a
predetermined range centered on the known connection data in
accordance with an input of the connection data.

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